

REVIEW OF INCONSISTENCIES BETWEEN SUDAS AND IOWA DOT SPECIFICATIONS

Phase II: Implementation of Recommendations into SUDAS Specifications

**Final Report
April 2008**

Principal Investigators:

Steven A. Klocke, P.E., Snyder & Associates, Inc.
Cindy A. Spencer, P.E., Snyder & Associates, Inc.

Sponsored by:

Iowa Highway Research Board
Project Number: TR-565

Snyder & Associates, Inc.
2727 SW Snyder Blvd.
Ankeny, IA 50023
www.snyder-associates.com

Disclaimer

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the information presented herein. The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the sponsors.

The sponsors assume no liability for the contents or use of the information contained in this document. This report does not constitute a standard, specification, or regulation. The sponsors do not endorse products or manufacturers. Trademarks or manufacturers' names appear in this report only because they are considered essential to the objectives of the document.

Statement of Non-Discrimination

Federal and state laws prohibit employment and/or public accommodation discrimination on the basis of age, color, creed, disability, gender identity, national origin, pregnancy, race, religion, sex, sexual orientation or veteran's status. If you believe you have been discriminated against, please contact the Iowa Civil Rights Commission at 800-457-4416 or Iowa Department of Transportation's affirmative action officer. If you need accommodations because of a disability to access the Iowa Department of Transportation's services, contact the agency's affirmative action officer at 800-262-0003.

Acknowledgements

Snyder & Associates would like to thank the following individuals for their time and contributions to this project.

Roger Bierbaum, Iowa DOT, Office of Contracts
Donna Buchwald, Iowa DOT, Office of Local Systems
Mark Dunn, Iowa DOT, Research and Technology
Daniel Harness, Iowa DOT, Specifications Section
Deanna Maifield, Iowa DOT, Office of Design
Chris Poole, Iowa DOT, Office of Design
Tom Reis, Iowa DOT, Specifications Section
Beth Richards, SUDAS
Dennis Smith, Iowa DOT, Urban Design
Larry Stevens, SUDAS
Paul Wiegand, SUDAS

Background Summary

In the 1990's, city, county, and utility agencies throughout central Iowa joined together to develop the Des Moines Metropolitan Standards and Specification Committee, with the goal of developing a unified set of design and construction standards that could be applied to work within these communities. The Urban Standard Specifications for Public Improvements were adopted in 1998. Soon thereafter, communities outside central Iowa began to realize the benefits and potential cost savings of utilizing the uniform specifications, and adopted them for their own use. The interest in the Urban Standard Specifications continued to grow. Eventually control and upkeep of the specifications was transferred to the Center for Transportation Research and Education at Iowa State University. CTRE developed the Statewide Urban Design and Specifications (SUDAS) program to expand the use of the specifications to a statewide basis. Under the SUDAS program, the original Des Moines Metropolitan Standards, have become the benchmark documents used in water main, sanitary sewer, storm sewer, and other urban items of work across the State of Iowa.

The DOT has expressed an interest in improving its Standard Specifications to include items of work typically associated with construction in urban areas. Rather than duplicating work already performed in the development of the SUDAS Specifications, the DOT desired to either reference or model new specifications after portions of the SUDAS specifications. Prior to the DOT utilizing the SUDAS Specifications, changes need to be made to eliminate conflicts with the DOT's specifications. At the same time, the revised specifications need to remain specific enough so there is no ambiguity in how items are constructed, what the material requirements are, and how the items will be measured and paid for.

To begin this process, a research project was initiated in 2004 to identify the inconsistencies between the two sets of specifications and standard drawings, with the aim of updating both the DOT and SUDAS specifications. This project (now referred to as Phase 1) compared the following areas:

- Definitions and abbreviations
- Bid items, measurement, and payment
- Construction methods and materials
- Standard drawings.

Both specifications were also examined to identify references to the contractual provisions portions of the documents (Division I of SUDAS and Division 11 of the DOT). The elimination of such references would make it possible to utilize the means and methods of one set of specifications with the general conditions of another. The specifications were also examined to determine areas of overlap and items of work covered by one and not the other.

Comparisons were made in 2005 and 2006, with a final report issued in May 2006. Since that time, both agencies have begun steps to implement the Phase 1 recommendations. SUDAS has rewritten and re-issued their Division 1, General Provisions and Covenants, incorporating the recommendations of the Phase 1 project. The Iowa DOT is currently in

Background Summary

the process of rewriting its entire specification manual and will be incorporating many of the revisions recommended in the Phase I report.

A second phase of this project was initiated in the fall of 2006 (now called Phase 2). This project proposed to implement the recommendations from Phase 1 for selected sections of the technical specifications and standard drawings, and incorporate them into the SUDAS specifications. Phase 2 focused on revising those areas identified by the Phase 1 committee as being the highest priority for the DOT's successful utilization of the SUDAS Specifications. These areas included: trench and backfill, trenchless construction, storm and sanitary sewers, water mains, manholes, intakes, sidewalks, recreation trails, and driveways.

The complete results of this project are contained within the appendix of this report.

Project Objectives

The current version of the SUDAS Specifications will be revised to accommodate the DOT's utilization of SUDAS. The revisions to the SUDAS Specifications will be based upon the recommendations from Phase 1. In some instances, the recommendations will require reorganization of portions of the SUDAS Specifications.

Upon incorporation of the Phase 1 recommendations, each applicable Division of the SUDAS Specifications will be updated into the active-imperative style, utilizing the 3-part specification format currently utilized by SUDAS.

Review and update the following SUDAS Divisions updated as described.

1. Division 3: Trench, Backfill, and Trenchless

Re-examine the bid items compared during Phase 1, including items for Class 20 Excavation, rock excavation, overexcavation and trench stabilization, and jacked pipe. Review pipe materials, allowed by the DOT, and consider for inclusion in the SUDAS Specifications. Revise all bid items into a three-part measurement, payment, and incidental format.

Relocate excavation and backfill requirements, related to intakes and manholes, to Division 6 (Structures for Sanitary and Storm). Remove references to Class 20 excavation the SUDAS Specifications. Develop revisions based upon the recommendations from Phase 1 and incorporate them into the specifications to accommodate the DOT's utilization of Division 3 of SUDAS.

2. Division 4: Sewers and Drains

Reexamine the bid items compared during Phase 1, including items for sanitary and storm sewer, testing, and other related items. Revise all bid items into a three-part measurement, payment, and incidental format. Incorporate recommended changes into the text.

Remove the SUDAS specifications for pipe culverts and subdrains from the storm sewer section of SUDAS in order to eliminate conflicts with the DOT. Place the specifications for pipe culverts and subdrains in their own section of SUDAS Division 4. Pay particular attention to the different terminology used between the DOT and SUDAS Specifications (for example Class III pipe in SUDAS is 2000D pipe in the DOT Specifications). Develop and incorporate revisions into the specifications to accommodate the DOT's utilization of Division 4 of SUDAS.

3. Division 5: Water Main and Appurtenances

Compare the specifications revised by SUDAS staff against the recommendations from the Phase 1 project to ensure all inconsistency issues have been addressed, and that the bid items are properly updated.

Project Objectives

4. Division 6: Structures for Sanitary and Storm

Reexamine the bid items compared in Phase 1, including items for manhole and intake structures, and other related items. Revise all bid items into a three-part measurement, payment, and incidental format.

Manholes and intakes, although separated into different specification sections, are generally constructed in a similar manner. Therefore, combine the manhole, intake, and structural concrete specifications into one all-encompassing, more concise, section to eliminate conflicts with the DOT's structural concrete specifications section.

Develop and incorporate revisions into the specifications, based upon the recommendations from Phase 1, to accommodate the DOT's utilization of Division 6 of SUDAS.

5. Section 7030: Recreational Trails, Sidewalks, and Driveways

Reexamine the bid items compared during Phase 1, including items for sidewalks, paved driveways, recreational trails, and curb ramps, along with other related items. Revise all bid items into a three-part measurement, payment, and incidental format.

Expand the driveway specifications to include granular surfacing.

Develop revisions and incorporate into the specifications, based upon the recommendations of Phase 1, to accommodate the DOT's possible future utilization of Section 7030.

6. Standard Drawings

Reexamine the comparisons between SUDAS figures and DOT Standard Road Plans, for those specification sections listed above.

Revise the SUDAS figures to a new format that more closely resembles the DOT Standard Road Plans. Eliminate conflicts identified during Phase 1 and update figures to accommodate the DOT's utilization of SUDAS figures.

Review Process

Each of the specification sections was revised in a similar manner. The process would begin with Snyder and Associates staff reviewing the existing specifications and the conflicts identified during the Phase I project. Snyder would then develop a plan for revising the specifications to eliminate these conflicts. For some of the specification sections, this required a complete restructuring and rewrite of the specifications.

Each of the revised specifications sections underwent a number of drafts before being presented to the committee for review. During the revision process, questions inevitably arose which required the consideration of the review committee. These questions were noted in the revised specifications for eventual discussion with and input from the review committee.

The final draft of the revised specifications sections was then presented to the committee for review and comment. The committee and Snyder staff reviewed each of the specifications section by section. Invaluable feedback was provided by the review committee. Through their input, additional changes were recommended and incorporated into the revised specification sections.

During the review period for a particular specification section, Snyder staff would begin the revisions to the SUDAS figures related to the specifications under review. New drafting standards were developed for SUDAS figures which are similar to the Iowa DOT's Standard Road Plans. During each figure's update, any errors were corrected and the language within the figure was revised to comply with the new specifications.

After completion of the specification review, the committee then had the opportunity to review and comment on the figures for that section.

The committee's recommended changes to the updated specifications and figures were incorporated and presented to them for final approval before moving on to the next specification section.

After receiving final approval from the review committee, the specifications and figures were presented to the SUDAS District Committees and Board of Directors for approval. The SUDAS committees typically provided additional comments that were incorporated into the final documents.

Results

This project produced new construction specifications that will be utilized by both the Iowa DOT and SUDAS. SUDAS will directly incorporate the final documents into the Urban Standard Specifications for Public Improvements. The Iowa DOT decided not to reference the SUDAS documents as originally planned, but will use the documents as a model for sections currently being developed for their new specifications book. This book is scheduled for release in 2009.

In addition to the specifications, new standard drawings were developed for each of the revised sections. Through discussions during the review meetings, the Iowa DOT and SUDAS have agreed to share many of these drawings. The Iowa DOT has agreed to develop a common title block that will be inserted into the drawing. The title block will contain SUDAS' logo and Figure number as well as the DOT's logo and Standard Road Plan number. Eventually, the responsibility for maintenance and upkeep of these drawings will be transferred to the Iowa DOT; however, SUDAS will retain jurisdiction over its original drawings.

After adoption by both agencies, both SUDAS and the Iowa DOT will have nearly identical construction specifications for urban construction items including trench and backfill, storm and sanitary sewer, water main, manholes, and intakes. This uniformity will ease frustration for both designers and contractors and provide for consistency between local and state projects.

The following pages contain summaries of the changes that were made to each section of the SUDAS Specifications.

Results

Division 3 – Trench and Trenchless Construction

The title of this division was revised from “Trench Backfill and Trenchless” to “Trench and Trenchless Construction” to provide a better description of the division contents.

The original organization of Division 3 was retained. Section 3010 covers underground work in trenches and was renamed from “Trench and Backfill” to “Trench Excavation and Backfill.”

Section 3020, Trenchless Construction, covers underground work installed with trenchless construction methods.

Both sections were re-written to the imperative mood. Language redundant with Division 1 was removed. The bid items were converted to a 3-part format indicating the method of measurement, basis of payment, and incidental work for each item.

Section 3010 was re-organized. The soil properties table was split up and the properties for each soil type were shown under the section for each particular soil type (e.g. the material properties for Class III material were given under the section for Class III material).

The pipe bedding and backfill specification section was expanded to describe each backfill and bedding area and what types of materials and compaction requirements are required within that area.

All bid items were eliminated from Section 3020. New trenchless bid items were established within each of the applicable sections (storm sewer, sanitary sewer, and water main).

Results

Summary of Changes to 3010 – Trench Excavation and Backfill

	Location	Comments
1	Section Title	Changed Title from “Trench and Backfill” to “Trench Excavation and Backfill”
2	Part 1	Updated to eliminate redundancy with Division 1
3	1.08, A	<i>General:</i> Provided a more detailed list of what items are incidental to the utility line being installed. Clarified that adjustment of the moisture content of excavated material was incidental.
4	1.08, C	<i>Trench Foundation:</i> replaced previous bid item “Over-Excavation and Trench Bottom Stabilization.” Clarified that overexcavation of unstable materials was incidental to the trench foundation material.
5	1.08, D	<i>Replacement of Unsuitable Backfill Material:</i> Replaced previous bid item “Unsuitable Backfill.” Clarified that the item was for replacement of unsuitable material.
6	1.08, E	<i>Special Pipe Embedment or Encasement:</i> Created a new bid item for concrete cradles and arches and encasement with concrete, flowable mortar, or CLSM.
7	1.08, F	<i>Trench Compaction Testing:</i> Made compaction testing a bid item to conform with the recently rewritten earthwork section (2010). Embankment compaction testing is a bid item when it is the contractor’s responsibility. Normally the Jurisdictions responsibility unless otherwise stated. Bid item is lump sum.
8	Old 1.08, B	<i>Open cut Casing Pipe Installation:</i> Item was deleted. The sanitary, storm, and water main sections not have separate bid items for installation of those utilities in a casing pipe.
9	Old 1.08, D	<i>Culvert Excavation:</i> Item was deleted. Previous item was for payment of excavation related to the installation of a culvert (Class 20). In urban areas, culverts are installed in the same manner as storm sewers and the related excavation should be incidental as well.
10	Old 1.08, F	<i>Structure Removal:</i> Item was deleted. Section 2010 currently contains a bid item for structure removal. This bid item was redundant.
11	Old 1.08, G	<i>Surfacing Removal and Replacement:</i> Item was deleted. This “bid item” made removal and replacement of pavement (street, driveways, and sidewalks) incidental to the utility being installed. This is inappropriate for most projects.
12	Old 1.08, H	<i>Abandoned Utilities:</i> This item was deleted. The previous bid item made removal of abandoned utilities in the work zone incidental. New bid items were added to the Storm, Sanitary, and Water Main sections to pay for the removal of such items.
13	Part 2	Entire section was re-organized for clarity
14	2.01, A	<i>Standard Trench Excavation:</i> Section re-written to better define what materials constitute Suitable, Unsuitable, and Topsoil.

Results

Summary of Changes to 3010 – Trench Excavation and Backfill (Continued)

	Location	Comments
15	2.02-2.04	<i>Bedding and Backfill Materials:</i> Section was re-organized. Material requirements were not changed.
16	2.05	<i>Special Pipe Embedment and Encasement Material:</i> The flowable mortar specification was revised to follow the Iowa DOT specifications.
17	Old 2.11, A	<i>Concrete Supports:</i> Deleted reference and figures dealing with special concrete supports over utilities. These are special situations that should be addressed on a project by project basis.
18	Old 3.02 J	<i>Structure Excavation:</i> Moved information regarding structure excavation to Division 6.
19	3.01	<i>Trench Excavation:</i> Statement was added requiring contractor to have trench excavations greater than 20 feet deep designed by a professional Engineer.
20	3.03	<i>Trench Protection:</i> This section was previous titled Sheeting, Shoring and Bracing and contained significantly more information (much of it on sheeting). Since the OSHA regulations cover trench safety, much of this section was eliminated to avoid any conflicts.
21	3.04	<i>Dewatering:</i> Required the contractor to install sediment control for water discharged directly from a trench.
22	3.05	<i>Pipe bedding and backfill:</i> Section was expanded to include some of the requirements previously indicated only on the figures
23	3.05, A	<i>General:</i> Contractor is required to dry or moisten excavate material to achieve the required moisture content for backfill.
24	3.05, B	<i>Pipe Bedding:</i> Required that Class I bedding material be “moderately consolidated” by slicing. Provided direction for bedding of water main and force main pipes in natural soils.
25	3.05, C	<i>Haunch Support:</i> Required that Class I bedding material be “moderately consolidated” by slicing. Suitable backfill materials must be compacted to 90% of Standard Proctor density.
26	3.05, D	<i>Primary and Secondary Backfill:</i> Required that granular material be compacted to minimum 65% relative density. Suitable materials must be compacted to 95% standard Proctor.
27	3.05, E	<i>Final Trench Backfill:</i> Required 65% relative density for granular, and 95% Proctor for other suitable.
28	3.06	<i>Testing:</i> summarized the requirements for testing when testing is the contractor’s responsibility. Frequency and location is the same as previous specification.

Results

Summary of changes to Section 3020 – Trenchless Construction

	Location	Comments
1	Part 1	Updated to eliminate redundancy with Division 1
2	1.08	<i>Measurement and Payment:</i> Eliminated all bid items from this section. They are covered under the related utilities being installed (sanitary, storm, water).
3	2.01	<i>Carrier Pipe:</i> added references to the appropriate sections (storm, sanitary, or water) for carrier pipe installed by trenchless methods.
4	2.02	<i>Casing Pipe:</i> Eliminated the wall thickness table in the current spec. This table is being moved to the design manual. The contract documents should indicate what the minimum casing pipe wall thickness is. Updated the reference to the AWS Code of Arc and Gas Welding in Building Construction. The referenced publication was last printed in 1946. The current standard is the “Structural Welding Code.”
5	3.04, A	<i>General:</i> Clarified that it is the contractors duty to select a trenchless installation method that will meet the specification requirements. Listed the allowable installation methods and provided a brief description of each. Removed references to trenchless methods that are not allowed.
6	3.05	<i>Pit Restoration:</i> Added a new section regarding clean-up and pit restoration.

Results

Division 4 – Sewers and Drains

Division 4 was reorganized. Originally, Division 4 was organized as follows:

- Section 4010: Sanitary Sewers
- Section 4020: Storm Sewers
- Section 4030: Pipe Rehabilitation
- Section 4040: Testing

Section 4020, Storm Sewers, contained specifications for storm sewer, subdrains, and culverts. The Iowa DOT has its own specifications for subdrain and culvert construction, which are used regularly, and does not intend to follow the SUDAS specifications for these items. Because of this, the specifications for culverts and subdrains were separated from the storm sewer specifications and moved to their own sections. Division 4 was reorganized as follows:

- Section 4010: Sanitary Sewers
- Section 4020: Storm Sewers
- Section 4030: Pipe Culverts
- Section 4040: Subdrains and Footing Drain Collectors
- Section 4050: Pipe Rehabilitation
- Section 4060: Cleaning, Inspection, and Testing

All sections were re-written to the imperative mood. Language redundant with Division 1 was removed. The bid items were converted to a 3-part format indicating the method of measurement, basis of payment, and incidental work for each item.

Results

Summary of changes to Section 4010 – Sanitary Sewers

	Location	Comments
1	1.08, A & B	<i>Sanitary Sewer:</i> Added bid items for trenchless (with and without a casing pipe) and a bid item for open cut sanitary with a casing pipe
2	1.08, G	<i>Sewage Air Release Valve & Pit:</i> Added an item for “connection to an existing manhole.” Previously, this had been in Division 6.
3	1.08, H	<i>Removal of Sanitary Sewer:</i> Followed Iowa DOT method of payment. No payment for removal of pipe (regardless of size). Filling pipe smaller than 36” with flowable mortar is incidental. Filling pipe larger than 36” is a pay item.
4	2.01, C	<i>Sanitary Sewer:</i> Removed note requiring “double wide gasket, indexed into two valleys” This is a proprietary feature (A-2000), and is not required to meet the ASTM specification.
5	2.02	<i>Force Mains:</i> Added specifications for tracer wire and tracer wire station for force mains.
6	Old 3.02	<i>Line and Grade:</i> Removed section on “line and grade (laser and batter boards).” Line and grade information is provided in the pipe installation section, and the required alignment tolerances are provided. This section is not needed.
7	3.05	<i>Force Main Installation:</i> Added a reference to the water main section for installation of force mains. Previously, no guidance was provided.
8	3.09	<i>Connection to Existing Manhole:</i> Added information regarding connection of sanitary sewer to existing manhole.

Results

Summary of changes to Section 4020 – Storm Sewers

	Location	Comments
1	1.08, A	<i>Storm Sewer:</i> Added bid items for trenchless (with and without a casing pipe) and a bid item for open cut sanitary with a casing pipe
2	1.08, C	<i>Removal of Storm Sewer:</i> Followed Iowa DOT method of payment. No payment for removal of pipe (regardless of size). Filling pipe smaller than 36” with flowable mortar is incidental. Filling pipe larger than 36” is a pay item.
3	1.08, D	<i>Connection to Existing Manhole:</i> Added an item for “connection to an existing manhole.” Previously, this had been in Division 6.
4	2.01, A-C	<i>Concrete Pipe:</i> Added reference to Iowa DOT’s equivalent classification for concrete pipe (i.e. Iowa DOT Class 2000D)
5	2.01 G - K	<i>Culvert Materials:</i> Brought pipe materials previously listed under culverts, over to the storm sewer section to avoid reference back to the culvert section, creating an issue for use by Iowa DOT.
6	3.02 & 3.04	<i>Pipe Installation:</i> Removed section on “line and grade” (laser and batter boards). Line and grade information is provided in the pipe installation section, and the required alignment tolerances are provided. This section is not needed.
7	3.02, C	<i>Trenchless:</i> Added a reference to 3020 for installation by trenchless methods.
8	3.04	<i>Pipe Jointing:</i> Combined several of the pipe jointing requirements. Listing each separately was redundant.
9	3.08	<i>Connection to Existing Manhole:</i> Added information regarding connection to existing manholes from Division 6.

Results

Summary of changes to Section 4030 – Pipe Culverts

	Location	Comments
1	General	This is a new section that was extracted from the original Section 4020 (Storm Sewers). Named section “Pipe” Culverts to clarify that they do not include box culverts.
2		
3	1.08, A	<i>Pipe Culverts:</i> Added bid item for trenchless construction.
4	1.08, C	<i>Footings for Concrete Pipe Aprons:</i> Added a bid item for concrete pipe apron footings
5	1.08, D	<i>Pipe Apron Guards:</i> Added a bid item for pipe apron guards
6	2.01	<i>Pipe Culverts:</i> Moved culvert materials (CMP, spiral rib, coated CMP, etc.) to storm sewer section. These materials could also be used for storm sewer (outside of the ROW). If they were listed in this section and referenced within 4020, it would create a conflict for use by the DOT.
7	2.01, A & B	<i>Roadway / Entrance Culverts:</i> Split up classification of culverts into roadway and entrance. Roadway culverts are concrete only. Entrance culverts allow RCP or CMP.
8	3.01	<i>Pipe Culvert Installation:</i> Provided direction for installing culverts in trenches and embankments.
9	3.02	<i>Aprons:</i> Added specifications regarding the installation of pipe aprons.

Summary of changes to Section 4040 – Subdrains

	Location	Comments
1	General	This is a new section that was extracted from the original Section 4020 (Storm Sewers).
2	1.08 C	<i>Cleanouts:</i> Added an item for subdrain or footing drain cleanouts.
3	1.08, D	<i>Outlets and Connections:</i> Added an item for subdrain or footing drain outlets and connections.
4	2.01	<i>Products:</i> Re-organized order of pipe materials. No changes to pipe material requirements. Listed all pipe materials out under 2.01. Called out allowable materials under each drain type in 2.02, - 2.04.
5	2.05	<i>Porous Backfill:</i> Added a gradation for pea-gravel backfill.
6	3.01	<i>Subdrains:</i> Provided installation requirements for subdrains.
7	3.03	<i>Cleanouts and Outlets:</i> Provided installation requirements for subdrain cleanouts and outlets.

Results

Summary of changes to Section 4050 –Pipe Rehabilitation

	Location	Comments
1	1.08, C	<i>Spot Repairs by Pipe Replacement:</i> Provided alternate form of bidding with both a count and a length. This is similar to patching. The idea is that there is a lot more work involved in doing three 10 foot spot repairs, than doing a single 30 foot repair.
2	Part 2 & 3	Minor formatting. No substantial changes.

Results

Division 5 – Water Mains and appurtenances

SUDAS staff, in conjunction with its water main committee, prepared the initial revision of this division. Work under this project involved reviewing the draft to ensure that the new specification did not create inconsistencies with the Iowa DOT specifications. The results contained herein contain both the revisions made by SUDAS and the revisions made under this project.

The original organization of Division 5 was retained as follows:

- 5010: Pipe and Fittings
- 5020: Valves, Fire Hydrants, and Appurtenances
- 5030: Testing and Disinfection

Section 5010 covers water main pipe and fittings. Section 5020 covers water main accessories. Section 5020 was renamed from “Valves, Hydrants, and Appurtenances” to “Valves, Fire Hydrants, and Appurtenances.” Section 5030 covers Testing and Disinfection of water mains.

All three sections were re-written to the imperative mood. Language redundant with Division 1 was removed. The bid items were converted to a 3-part format indicating the method of measurement, basis of payment, and incidental work for each item.

Summary of changes to Section 5010 –Pipe and Fittings

	Location	Comments
1	1.08	<i>Measurement and Payment:</i> Developed separate bid items for water main with and without a casing pipe, and for water main installed in a trench or installed with trenchless techniques.
2	1.08, C	<i>Fittings:</i> Added option to pay for fittings by weight in lieu of count
3	2.01, A	<i>PVC Pipe:</i> Added joint requirements for restrained joint pipe to accommodate trenchless and casing installation.
4	2.08	<i>Non-Shrink Grout:</i> Added specification for non-shrink grout. Previously no guidance was provided.
5	2.08	<i>Casing Pipe:</i> Added specification reference for casing pipe requirements. Previously, no guidance was provided.
6	3.02	<i>Ductile Iron Requirements:</i> Required use of full length gauged pipe for field cuts, or pipe must be field gauged.
7	3.03	<i>PVC Requirements:</i> added additional requirements regarding jointing of PVC pipe.

Results

Summary of changes to Section 5020 –Valves, Fire Hydrants, and Appurtenances

	Location	Comments
1	1.08, A	<i>Butterfly or Gate Valve:</i> Combined bid items for butterfly and gate valves.
2	2.01, A	<i>Valves:</i> made direction of opening counterclockwise as the default.
3	2.01, C	<i>Butterfly Valves:</i> Updated the material requirements for butterfly valves.
4	2.01, D	<i>Tapping Valves:</i> Reduced the required pressure rating for tapping sleeves from 200 psi to 150 psi. 150 psi tapping sleeves are much more common, and match the pressure rating of the pipe.
5	2.03, C	<i>Valve Stem Extension:</i> Added specifications for a valve stem extension.

Summary of changes to Section 5030 – Testing and Disinfection

	Location	Comments
1	1.08	<i>Measurement for Payment:</i> Clarified that Testing and disinfection are incidental.
2	2.01	<i>Disinfecting Agent:</i> Added liquid chlorine as an acceptable disinfecting agent.
3	3.01	<i>Sequence of Testing and Disinfection:</i> Renamed section from Sequence of Operation and added tablet method as an alternative disinfection method. Reordered the sequence of testing and disinfection to require disinfection of the line prior to pressure testing.
4	3.02	<i>Initial Flushing:</i> Added table indicating required flow rate to achieve flushing velocity.
5	3.03	<i>Disinfection:</i> Added provisions to accommodate the tablet method of disinfection.
6	3.05	<i>Pressure and Leak Testing:</i> Revised equation for determining allowable leakage rate.
7	3.06	<i>Bacteria Testing:</i> Added new section on bacteria sampling

Results

Division 6 – Structures for Sanitary and Storm Sewers

Division 6 was reorganized. Originally, Division 6 was organized as follows:

- Section 6010: Concrete (Structural)
- Section 6020: Manholes
- Section 6030: Intakes
- Section 6040: Testing

Sections 6010 through 6030 were combined into a single specification. There were two reasons for this change. First, the Iowa DOT specifications already contain information concerning structural concrete, generally for use with bridge and culvert structures. Having a separate section titled structural concrete, intended only for use with utility structures, created confusion within the Iowa DOT Specification. While combining the three sections, much of the information within SUDAS concerning structural concrete was removed and replaced with a reference to the Structural Concrete section of the Iowa DOT specifications in order to avoid conflicts. The second reason for the combination is that work and materials involved in manhole and intake construction are nearly identical. There did not appear to be a valid reason for keeping these two items separate.

The original Section 6020 also contained specifications for manhole rehabilitation. After combining Sections 6010 through 6030 into a single specification, the rehabilitation items were no longer appropriate for the combined specification. A new Section 6020 was developed to address manhole rehabilitation.

The revised organization of Division 6 is as follows:

- Section 6010: Structures for Sanitary and Storm Sewers
- Section 6020: Rehabilitation of Existing Manholes
- Section 6030: Testing and Inspection

All sections were re-written to the imperative mood. Language redundant with Division 1 was removed. The bid items were converted to a 3-part format indicating the method of measurement, basis of payment, and incidental work for each item.

Results

Summary of changes to Section 6010 – Structures for Sanitary and Storm Sewer

	Location	Comments
1	General	Sections 6010, 6020, and 6030 were combined into a single section.
2	1.08 A & B	<i>Measurement and Payment for Manholes and Intakes:</i> Measurement and Payment of manholes and intakes will be by each (regardless of depth). There was a proposal to change this to include additional payment for manholes and intakes greater than 10 feet deep, but the SUDAS districts rejected it.
3	1.08 C	<i>Measurement and Payment for Drop Connections:</i> Measurement and payment for drop connections was changed from vertical feet to each as requested by the districts.
4	1.08 E	<i>Measurement and Payment for Minor Adjustment:</i> Manhole or Intake Adjustment, Minor: This item was changed from incidental, to a pay item by “each.” Incidental items were clarified to include a new casting, chimney seal, and pavement repair.
5	1.08 F	<i>Measurement and Payment for Major Adjustment:</i> Manhole or Intake Adjustment, Major: The incidental items were clarified to include the new intake or manhole sections.
6	1.08	<i>Manhole Rehabilitation:</i> The manhole rehabilitation items were moved to a new section: 6020 – Rehabilitation of Existing Manholes.
7	1.08	<i>CMP Slotted Drain:</i> The CMP slotted drain intake item was removed from the specifications.
8	2.01	<i>Manhole and Intake Types:</i> A combined table showing intake and manhole types was moved to the front of the products section.
9	2.02, A	<i>Precast Concrete Materials:</i> Added a reference to ASTM specifications for Precast structures.
10	2.02, B	<i>Cast-in-place Concrete Materials:</i> The current specifications call for Class C concrete and then reference either the Iowa DOT specifications or Section 7010 (which then references the Iowa DOT specifications). The specifications were revised to call for Class C concrete and then reference the Iowa DOT specifications directly.
11	2.04	<i>Non-Shrink Grout:</i> A reference to the Iowa DOT specification was added. Currently, there is no specification for non-shrink grout anywhere in the SUDAS manual, although it is specified in a number of locations.
12	2.10	<i>Castings:</i> Two types of castings are now defined: Standard and light duty. Standard duty are required in all traffic areas.
13	3.01 C	<i>Subbase:</i> A clarification was made that for precast structures, an 8” granular base is required. This was shown in some figures, but was never included in the specifications.

Results

Summary of changes to Section 6010 – Structures for Sanitary and Storm Sewer (Continued)

	Location	Comments
14	3.02	<i>Construction of Cast-In-Place Structures:</i> Most of the existing sections made reference to Iowa DOT 2403 (Structural Concrete), but then included additional information or requirements, much of which was redundant to 2403. The sections were reviewed and the redundant information was removed.
15	3.03, A	<i>Precast Structures:</i> A specific allowance was made to permit the substitution of precast structures for cast-in-place structures. The remaining items were pulled together from existing sections.
16	3.05	<i>Connection to Existing Manhole or Intake:</i> The sections for connection to an existing manhole or intake were moved to Division 4.

Summary of changes to Section 6020 – Rehabilitation of Existing Manholes

	Location	Comments
1	General	This section was pulled out of the existing Manhole specification section, and re-written as a stand-alone section.
2	1.08, A	<i>Rubber Chimney Seal:</i> This item was moved from the existing manhole section. Chimney seals are incidental to all new or adjusted manholes, and having this item in that section seemed to imply that it was a pay item. This item is intended to cover rehabilitation projects, where an existing manhole does not have a chimney seal.
3	1.08, B	<i>Urethane chimney seal:</i> This product is included in the existing specifications, but no pay item was provided. A new bid item was developed for rehabilitation work.
4	1.08, C	<i>In-Situ Manhole Replacement, Cast-in-Place Concrete:</i> A new bid item was developed for rehabilitation work.
5	1.08, D	<i>In-Situ Manhole Replacement, Cast-in-Place Concrete with Plastic Liner:</i> A new bid item was developed for rehabilitation work.
6	1.08, E	<i>Manhole Lining with Centrifugally Cast Cementitious Mortar Liner with Epoxy Seal:</i> A new bid item was developed for rehabilitation work.
7	1.08, C-E	<i>Manhole Rehabilitation:</i> Clarified that new castings are required on all rehabilitated manholes.

Results

Summary of changes to Section 6030 – Testing and Inspection

	Location	Comments
1	General	This section was moved from previous 6040 due to the combining of 6010, 6020, & 6030.
2	Title	The title of this section was changed from “Testing” to “Testing and Inspection” to better reflect the work involved.
3	Part 2	This section was eliminated. There are no products required.
4	3.03	The repair requirements were removed and a reference back to the repair requirement of 6010 was added.
5	3.04	Section was reorganized to cover miscellaneous requirements under a “General” section.
6	3.04	Pressure measurements were changed from inches of mercury to psi.

Results

Section 7030 – Recreational Trails, Sidewalks, and Driveways

Section 7030, Recreational Trails, Sidewalks, and Driveways is part of Division 7, Streets and Related Work. Only Section 7030 was revised in conjunction with this project.

The Iowa DOT does not intent to modify their current specifications to follow the revised SUDAS specifications for 7030 at this time. However, this may be done in the future. Regardless, there was a desire to eliminate inconsistencies with the Iowa DOT’s specifications since the items covered in this section are often constructed by both local jurisdictions and the DOT.

The entire section was re-written to the imperative mood. Language redundant with Division 1 was removed. The bid items were converted to a 3-part format indicating the method of measurement, basis of payment, and incidental work for each item.

	Location	Comments
1	1.08	<i>Measurement and Payment:</i> Rearranged bid items to follow order of installation.
2	1.08, A	<i>Removal of Recreational Trail, Sidewalk, or Driveway:</i> renamed from Sidewalk/Driveway
3	1.08, B	<i>Removal of Curb:</i> Added new item for curb grinding/sawing for installation of ramps and driveways.
4	1.08, C	<i>Recreational Trail:</i> Changed measurement to plan quantity.
5	1.08, D	<i>Special Subgrade Preparation for Recreational Trail:</i> Made general subgrade preparation incidental to recreational trail construction (Iowa DOT natural subgrade prep.). Added a new item for special subgrade preparation (scarify, mix, and compact with Type A compaction).
6	1.08, F	<i>Brick Sidewalk:</i> Revised bid item so concrete base and setting bed are included. Previously, these had been separate bid items.
7	1.08, I	<i>Recreational Trail, Sidewalk, and Driveway Assurance Testing:</i> Clarified that any concrete or HMA testing will be provided by the jurisdiction. Added a new pay item for situations where the contractor is required to provide testing.
8		
9	2.01, A	<i>Portland Cement Concrete:</i> Clarified that concrete is to be Class B or Class C. Previously said Class B “or better.”
10	2.02	<i>Hot Mix Asphalt:</i> Gave contractor the option of binder grade 58-28 or 64-22. Revised HMA mixture for recreational trails that also function as a shoulder from 1,000,000 ESAL mix to 300,000 ESAL mix.
11	2.05	<i>Neoprene Modified Asphalt Adhesive for Brick:</i> Clarified testing requirements and values. Removed reference to proprietary product.
12	2.07	<i>Detectable Warnings:</i> Eliminated stamped detectable warnings.

Results

Section 7030 – Recreational Trails, Sidewalks, and Driveways (Continued)

	Location	Comments
13	2.08	<i>Granular Driveway Surfacing:</i> Added a material specification for granular driveway surfacing (Iowa DOT driveway surfacing).
14	Old 3.01	<i>Utility Protection:</i> Removed. This information is covered in Division 1.
15	Old 3.02	<i>Grading:</i> Removed. This section is redundant with 2010.
16	3.02, A	<p><i>Subgrade Preparation:</i> Current specifications require the same subgrade prep as for roadway construction (i.e. scarify top 12 inches and recompact).</p> <p>Revised subgrade prep for recreational trails so default follows Iowa DOT 2109 (Natural Subgrade). Iowa DOT's Natural Subgrade requires the top 6 inches to be rolled firm and uniform. Any soft spots are scarified and recompact.</p> <p>A Special Subgrade Preparation item was added for use when specified. Requires scarification of top 6 inches and Type A compaction across entire subgrade.</p>
17	3.02, B	<i>Sidewalk and Driveway Subgrade Prep:</i> Current specifications require driveways to be prepared the same as roads. Reduced subgrade preparation requirements for sidewalks and driveways to: stripping organic material, tamping any fill material, removal and replacement of soft spots with suitable backfill..
18	3.03	<i>Adjustment of Fixtures:</i> Referenced appropriate sections for fixture adjustment.
19	3.04	<i>PCC Recreational Trails, Sidewalks, and Driveways:</i> Revised section to reference Section 7010 where possible, eliminating duplicate information and possibility for conflicts.
20	3.12	<i>Testing:</i> summarized the requirements for testing when testing is the contractor's responsibility. Frequency and location is the same as previous specification.

Project Summary

The Phase 1 (TR-524) study identified inconsistencies between the Iowa DOT and SUDAS in Divisions 1, 2, 3, 4, 5, 6, 7, and 9 of the SUDAS specifications. With the work completed under the Phase 2 project and other related projects, a majority of the inconsistencies within the SUDAS manual have been addressed and eliminated through re-writes of the conflicting sections. The following table summarizes the status for the overall update of the SUDAS manual:

<i>Division</i>		<i>Status</i>	<i>Notes</i>
Division 1	General Provisions	Update complete	Updates completed by SUDAS staff.
Division 2	Earthwork	Update complete	Updates completed by SUDAS staff.
Division 3	Trench & Trenchless	Update complete	Completed under TR-565
Division 4	Sewers & Drains	Update complete	Completed under TR-565
Division 5	Water mains	Update complete	Completed by SUDAS staff and under TR-565
Division 6	Structures for Sanitary & Storm	Update complete	Completed under TR-565
Division 7	Streets & Related Work	Partially complete	Section 7020 specs revised by SUDAS staff. Section 7030 completed under TR-565. Sections 7010, 7040, 7050, 7060, & 7070 remain.
Division 8	Traffic Signals	In progress	Update in progress under TR-546
Division 9	Site Work	Partially complete	Sections 9010 and 9040 updated under TR-508. Sections 9020, 9030, 9050, 9060, 9070, and 9080 remain.
Division 10	Utility Locations	No update proposed	This Division was not reviewed under Phase I
Division 11	Demolition	No update proposed	This Division was not reviewed under Phase I

As can be seen in the table, several sections reviewed under the Phase 1 project have not yet been revised and still contain inconsistencies with the Iowa DOT specifications manual.

Most of Division 7, Streets & Related Work, has not been addressed. This includes Section 7010, PCC Pavement; Section 7020, HMA Pavement; Section 7040, Pavement Repair and Rehabilitation; Section 7050, Asphalt Stabilization; Section 7060, Bituminous Seal Coat; and Section 7070, Emulsified Asphalt Slurry Seal. SUDAS staff is currently developing a plan to address the inconsistencies for concrete pavement within Section 7010. Separate research projects are proposed for the pavement maintenance practices in Sections 7050, 7060, and 7070. The only items in Division 7, identified in the Phase 1 project, that have not yet been assigned, are the figures in Sections 7010 and 7020, and the figures and specifications in Section 7040.

A majority of the specifications and figures in Division 9 also require updates to eliminate inconsistencies. This includes Section 9020, Sodding; Section 9030, Plant Material and Planting; Section 9050, Gabions and Rip Rap; Section 9060, Fencing; Section 9070, Retaining Walls; and Section 9080, Concrete Steps and Handrail.

Recommendations

The Iowa DOT intends to publish a new specification manual in early 2009. Ideally, the remaining items identified during the Phase 1 project would be addressed before issuing this manual. In order to accomplish this, a third phase of this project may be proposed.

The third and final phase would address the remaining work that has not yet been completed or assigned to another project. The third phase would include the figures in Section 7010 and 7020, the specifications and figures in Section 7040, and all of the specifications and figures in Division 9 (with the exception of Sections 9010 and 9040).

In order to meet the Iowa DOT's schedule for review and publication, work on the remaining items needs to be completed by the fall of 2008. With the volume of work involved, the proposed Phase 3 project would need to begin in the spring or early summer of 2008 and move quickly to meet the completion deadline.

Completion of the work proposed under Phase 3 of this project and completion of other ongoing or proposed projects, will achieve the goal of eliminating significant conflicts between SUDAS and the Iowa DOT specifications. The result will be a pair of specifications that complement each other, do not conflict, and are easier for both designers and contractors to use. The benefit of these improvements is cost savings to the public through fewer change orders and less time spent comparing contract language.